77

FLASH!

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T/S 1000 & ZX81 8k ROM 16k RAM

INTRODUCTION:

FLASH! inverts the video display. This demo can be used as is or incorporated into your own programs to almost instantly invert the screen. It does not clear the screen but merely changes all charachters from regular, black on white, to reverse, white on black, and vice versa.

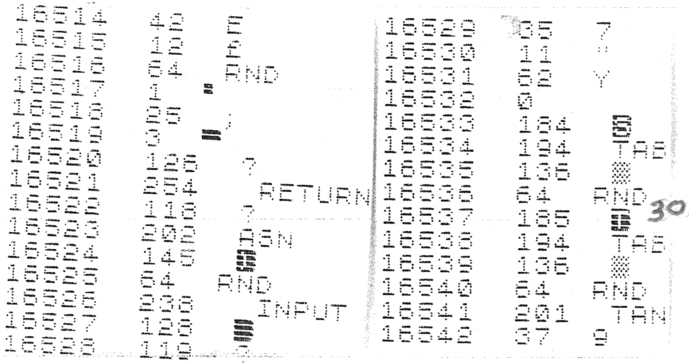
INSTRUCTIONS:

From tape:

Type LOAD "FLASH" or LOAD "" then ENTER. When the computer stops with report code 0/0 touch RUN and ENTER. Press the BREAK key to stop.

From listing:

Type in the Loader program:

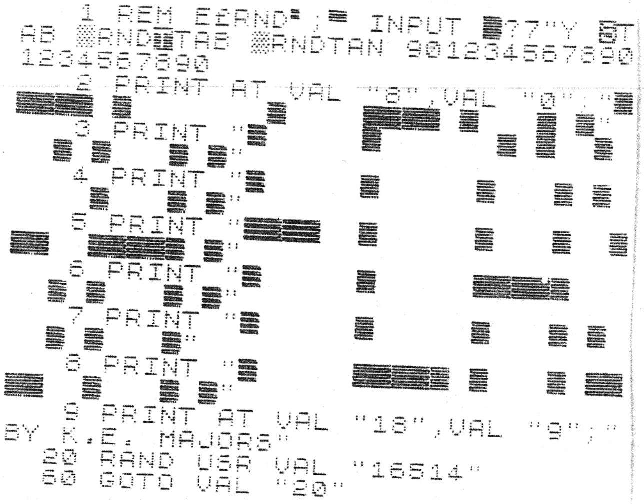


```
16514  42  E          16529  35  7
16515  12  £          16530  11  "
16516  64  RND        16531  62  Y
16517  1   ▘          16532  0
16518  25  ;          16533  184 █
16519  3   ▀          16534  194 TAB
16520  126  ?         16535  136 ▒
16521  254  RETURN    16536  64  RND
16522  118  ?         16537  185 █
16523  202  ASN       16538  194 TAB
16524  145  █         16539  136 ▒
16525  64  RND        16540  64  RND
16526  238  INPUT     16541  201 TAN
16527  128  █         16542  37  9
16528  119  ?
```

```
1 REM ......29 spaces ..........
..
10 LET A$ = "2A0C4001C0027EFE76CA
9140EE8077230B3E00B8C28840B9C2884
0C9"
20 LET A = 16514
30 FOR B = 1 TO LEN A$-1 STEP 2
40 POKE A,16 * CODE A$(B) + CODE
A$(B+1) -476
50 LET A = A+1
60 NEXT B
```

Check A$ very carefully before running, then run the program. The REM in line 1 will look rather strange when finished.
Delete all lines except line 1, and enter the following listing. Use the grid in figure 1 to help with the PRINTs in lines 2 through 8.

The Listing



```
   1 REM E£RND▘;▀ INPUT █?7"Y █T
AB ▒RND█TAB ▒RNDTAN 901234567890
1234567890
   2 PRINT AT VAL "8",VAL "0";"█
██ █     █          ██ █  █  █"
   3 PRINT "█
 █ █   █ █"          █      █  █ █
   4 PRINT "█
  █   █ █"           █     █   █ █
   5 PRINT "███
█   ███ █"           █     █   █  █
   6 PRINT "█
 █ █   █ █"          █     ███
   7 PRINT "█
 █ █   █"            █     █   █ █
   8 PRINT "█
█  █   █ █"          ███  █    █ █
   9 PRINT AT VAL "18",VAL "9";"
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  20 RAND USR VAL "16514"
  60 GOTO VAL "20"
```
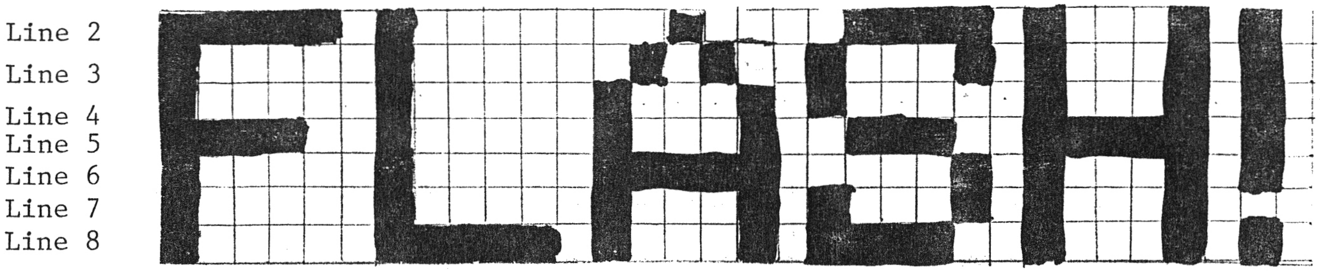

Figure 1



Now that you have it all entered SAVE it to tape then touch RUN and ENTER. Isn't that interesting!

The Machine Code:

```
HEX            Label     Code                 Comment
------------------------------------------------------------------------
2A0C04         START     LD HL,(D_FILE)       ;Get addr of display file
01C002                   LD BC,02C0           ;Set BC to 704d
7E             NEXT      LD A,(HL)            ;Put contents of HL in A
FE76                     CP 76h               ;Check for end of line?
CA9140                   JP Z,UP              ;Yes GOTO UP
EE80                     XOR 80h              ;Invert charachter
77                       LD (HL),A            ;Put it back
23             UP        INC HL               ;Move to next one
0B                       DEC BC               ;adjust count
3E00                     LD A,00              ;Put 0 in A
B8                       CP B                 ;B=0
C28840                   JP NZ,NEXT           ;No GOTO NEXT
B9                       CP C                 ;C=0
C28840                   JP NZ,NEXT           ;No GOTO NEXT
C9                       RET                  ;Return to BASIC
```

HOW IT WORKS:

Lines 2 to 9 of the Basic program PRINT a message on the screen so you can see the display invert and not just fill with spaces and inverse spaces. Line 20 calls the MC routine held in line 1, and line 60 just keeps doing it.

The instruction that actually does the inverting in the MC routine is XOR 80h. The way it works is a little complicated to explain. The logic is "one or the other but not both". As an example let's XOR a regular space, CHR$ 00, and 80h.

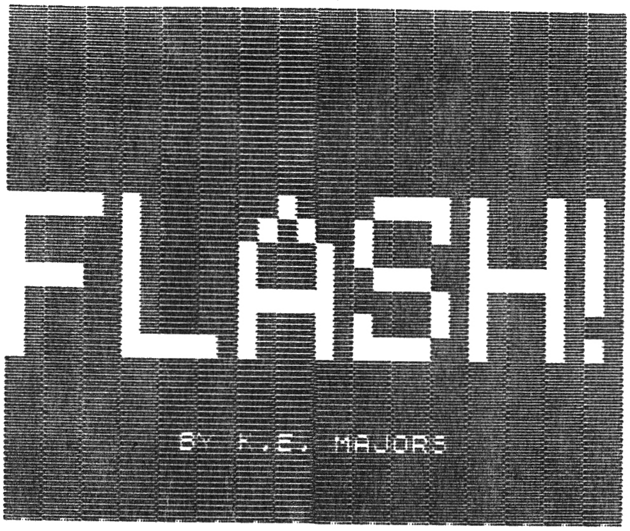
```
0000 0000 CHR$ 0 regular space      1000 0000 CHR$ 128 inv space
1000 0000  80h                      1000 0000 80h
----------                          ----------
1000 0000 CHR$ 128 inverse space    0000 0000 CHR$ 0 reg space
```

See how it works. Try it with other charachters until you understand.

APPLICATIONS:

FLASH! can be used to present an eye catching title page or as a fast way to invert the display for games or any application where it would be nice to have the video on the screen reversed.

This program can be used on a 2k RAM T/S 1000 but due to the diference in the display file only the screen that is actually printed on is reversed. Try it and see what I mean.



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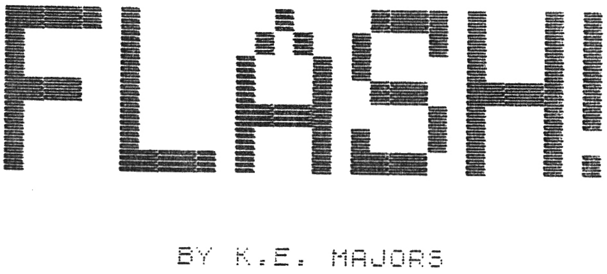

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